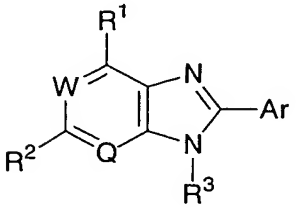
Claims

1. A condensed imidazole compound, a pharmacologically acceptable salt thereof or hydrates thereof, which is represented by the formula (I):



(wherein R^1 represents 1) hydrogen, 2) hydroxyl, 3) a halogen atom, 4) an optionally substituted C1-C8 alkyl group or 5) formula $-NR^4R^5$ (wherein R^4 and R^5 are the same as or different from each other and each represents hydrogen, a C1-C8 alkyl group, a C3-C8 cycloalkyl group, or a C2-C5 saturated cyclic amino group which is formed with the nitrogen to which they bind, whereupon this ring may contain oxygen, sulfur or nitrogen other than the nitrogen and may be substituted with a C1-C4 alkyl group which may be substituted with a halogen atom; R^2 represents 1) hydrogen, 2) a halogen atom, 3) formula $-NR^6R^7$ (wherein R^6 and R^7 are the same as or different from each other and each represents hydrogen, a C2-C5 acyl group, a C1-C8 alkyl group or a C3-C8 cycloalkyl group, or R^6 and R^7 represent a C2-C5 saturated cyclic amino group which is formed with the nitrogen to which they bind, whereupon this ring may contain oxygen, sulfur or nitrogen other than the said nitrogen and may be substituted with a C1-C4 alkyl group which may be substituted

with a halogen atom), 4) a C2-C8 alkynyl group which may be substituted with a halogen atom, hydroxyl, a C1-C4 alkyl group or a C3-C6 cycloalkyl group, 5) a C3-C8 alkenyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group, 6) a C1-C8 alkyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group or 7) a C1-C8 alkoxy group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group; R^3 represents 1) a C3-C8 alkynyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group, 2) a C3-C8 alkenyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group, 3) a C1-C8 alkyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group, 4) an optionally substituted aryl group, 5) an optionally substituted heteroaryl group, 6) a 1,2-dihydro-2-oxopyridyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom may further be substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group, b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group or b-3) an optionally substituted C3-C6 cycloalkyl group, 7) a dihydroxopyrimidyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom is further substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group, b-2) an optionally substituted C3-C6

B20 Cont

cycloalkyl-C1-C4 alkyl group or b-3) a C3-C6 cycloalkyl group or 8) a dihydroxo- or tetrahydrodioxopyrazinyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom is further substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group, b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group or b-3) a C3-C6 cycloalkyl group; Ar represents 1) an optionally substituted aryl group, 2) an optionally substituted heteroaryl group, 3) an oxopyridyl group which may be substituted with a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom is further substituted with a C1-C6 alkyl group or a C3-C6 cycloalkyl group or 4) an oxopyrimidyl group which may be substituted with a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom is further substituted with a C1-C6 alkyl group or a C3-C6 cycloalkyl group; and Q and W are the same as or different from each other and each represents N or CH, provided that when R^2 is 4) a C2-C8 alkynyl group which may be substituted with a halogen atom, hydroxyl, a C1-C4 alkyl group or a C3-C6 cycloalkyl group, 5) a C3-C8 alkenyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group or 6) a C1-C8 alkyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group, R^3 is not 3) a C1-C8 alkyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group or 4) an optionally substituted aryl group.

2. The condensed imidazole compound according to claim 1, a pharmacologically acceptable salt thereof or hydrates thereof, wherein R^2 is hydrogen atom.

R20 cont

3. The condensed imidazole compound according to claim 1 or 2, a pharmacologically acceptable salt thereof or hydrates thereof, wherein R^3 represents 1) an optionally substituted heteroaryl group, 2) a 1,2-dihydro-2-oxopyridyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom may further be substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group, b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group or b-3) an optionally substituted C3-C6 cycloalkyl group, 3) a dihydroxopyrimidyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom is further substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl, or an optionally protected carboxyl group, b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group or b-3) a C3-C6 cycloalkyl group, or 4) a dihydroxo or tetrahydrodioxopyrazinyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom is further substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group, b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group, or b-3) a C3-C6 cycloalkyl group.

4. The condensed imidazole compound according to any of claims 1 to 3, a pharmacologically acceptable salt thereof or hydrates thereof, wherein R^3 represents 1) an optionally substituted pyridyl group, 2) an optionally substituted pyrimidyl group, 3) a 1,2-dihydro-2-oxopyridyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom is further substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group; b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group; or b-3) an optionally substituted C3-C6 cycloalkyl group, or 4) a dihydroxopyrimidyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom is further substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group; b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group; or b-3) a C3-C6 cycloalkyl group.

5. The condensed imidazole compound according to any of claims 1 to 4, a pharmacologically acceptable salt thereof or hydrates thereof, wherein Ar is an optionally substituted aryl.

6. The condensed imidazole compound according to any of claims 1 to 5, a pharmacologically acceptable salt thereof or hydrates thereof, wherein Ar is a phenyl substituted with a halogen atom.

7. The condensed imidazole compound according to any of claims 1 to 6, a pharmacologically acceptable salt thereof or

hydrates thereof, wherein R^1 is represented by the formula $-NR^4R^5$ (wherein R^4 and R^5 are the same as or different from each other and each represents hydrogen, a C1-C8 alkyl group or a C3-C8 cycloalkyl group, or a C2-C5 saturated cyclic amino group which is formed with a nitrogen atom to which they bind, whereupon this ring may contain oxygen, sulfur or nitrogen other than the nitrogen and may be substituted with a C1-C4 alkyl group which may be substituted with a halogen atom.

Sub A3

8. The condensed imidazole compound according to any of claims 1 to 7, a pharmacologically acceptable salt thereof or hydrates thereof, wherein R^1 is amino.

9. The condensed imidazole compound according to any of claims 1 to 8, a pharmacologically acceptable salt thereof or hydrates thereof, wherein R^1 is amino; R^2 is hydrogen; and R^3 is 1) a pyridyl group which may be substituted with hydroxyl or a C1-C6 alkyl group or 2) a 1,2-dihydro-2-oxopyridyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom may further be substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group; b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group; or b-3) an optionally substituted C3-C6 cycloalkyl group.

10. The condensed imidazole compound according to any of claims 1 to 9, a pharmacologically acceptable salt thereof or hydrates thereof, wherein R^1 is amino, R^2 is hydrogen, and R^3 is a 1,2-dihydro-2-oxopyridyl group whose nitrogen may be

substituted with a C1 to C6 alkyl group which may be substituted with a halogen atom.

Sub A3

11. The condensed imidazole compound according to any of claims 1 to 8, a pharmacologically acceptable salt thereof or hydrates thereof, wherein R^1 is amino, R^2 is a C2 alkynyl group which is substituted with hydroxyll group and a C4-C6 cycloalkyl group, R^3 is a C3 alkenyl group, and Ar is a phenyl substituted with a halogen atom.

B20 cont

12. The condensed imidazole compound according to claim 1, which is selected from the following group:

1) 5-[6-amino-8-(3-fluorophenyl)-9 H-9-purinyl]-1-methyl-1, 2-dihydro-2-pyridinone, and

2) 1-{2-[6-amino-8-(3-fluorophenyl)-9-(2-propenyl)-9 H-2-purinyl]-1-ethynyl}-1-cyclobutanol,

a pharmacologically acceptable salt thereof or hydrates thereof.

13. The condensed imidazole compound according to claim 1, a pharmacologically acceptable salt thereof or hydrates thereof, which is a purine compound wherein each of Q and W means nitrogen.

14. The condensed imidazole compound according to claim 1, a pharmacologically acceptable salt thereof or hydrates thereof, which is a benzoimidazol compound wherein each of Q and W means -CH.

15. The condensed imidazole compound according to claim 1, a pharmacologically acceptable salt thereof or hydrates

thereof, which is an imidazopyridine compound wherein one of Q and W is N, and the other is -CH.

16. An agent for preventing or treating diabetes mellitus, which comprises the condensed imidazole compound according to any of claims 1 to 15, a pharmacologically acceptable salt thereof or hydrates thereof as the active ingredient.

17. An agent for preventing or treating diabetic complications, which comprises the condensed imidazole compound according to any of claims 1 to 15, a pharmacologically acceptable salt thereof or hydrates thereof as the active ingredient.

18. An agent for preventing or treating diseases against which the condensed imidazole compound according to any of claims 1 to 15, a pharmacologically acceptable salt thereof or hydrates thereof is effective.

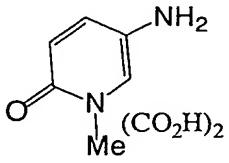
19. An agent for preventing or treating diabetic retinopathy, which comprises the condensed imidazole compound according to any of claims 1 to 15, a pharmacologically acceptable salt thereof or hydrates thereof as the active ingredient.

20. An adenosine A2 receptor antagonist comprising the condensed imidazole compound according to any of claims 1 to 15, a pharmacologically acceptable salt thereof or hydrates thereof.

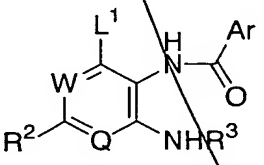
21. A pharmaceutical composition comprising the condensed imidazole compound according to any of claims 1 to 15, a

pharmacologically acceptable salt thereof or hydrates thereof and a pharmacologically acceptable carrier.

22. 5-Amino-1-methyl-2(1H)-pyridone oxalate represented by the following formula:

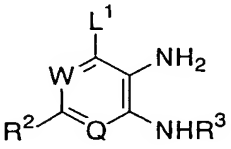


23. A process for producing an acylaminopyridine compound (A3) represented by the following formula:



(A3)

(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined below, respectively), a salt thereof or hydrates thereof, which comprises allowing an aminopyridine compound (A2) represented by the following formula:



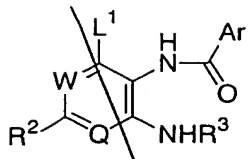
(A2)

(wherein L^1 represents a halogen atom; R^2 represents 1) hydrogen, 2) a halogen atom, 3) formula $-NR^6R^7$ (wherein R^6 and R^7 are the same as or different from each other and represent hydrogen, a C2-C5 acyl group, a C1-C8 alkyl group or a C3-C8 cycloalkyl group, or R^6 and R^7 represent a C2-C5 saturated cyclic amino

group which is formed with a nitrogen atom to which they bind, whereupon this ring may contain an oxygen atom, a sulfur atom or a nitrogen atom other than the nitrogen atom and may be substituted with a C1-C4 alkyl group which may be substituted with a halogen atom), 4) a C2-C8 alkynyl group which may be substituted with a halogen atom, hydroxyl, a C1-C4 alkyl group or a C3-C6 cycloalkyl group, 5) a C3-C8 alkenyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group, 6) a C1-C8 alkyl group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group, or 7) a C1-C8 alkoxy group which may be substituted with a halogen atom, hydroxyl or a C1-C4 alkyl group; R^3 represents 1) a C3-C8 alkynyl group which may be substituted with a halogen atom, a hydroxyl group or a C1-C4 alkyl group, 2) a C3-C8 alkenyl group which may be substituted with a halogen atom, a hydroxyl group or a C1-C4 alkyl group, 3) a C1-C8 alkyl group which may be substituted with a halogen atom, a hydroxyl group or a C1-C4 alkyl group, 4) an optionally substituted aryl group, 5) an optionally substituted heteroaryl group, 6) a 1,2-dihydro-2-oxopyridyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom may further be substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group, b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group or b-3) an optionally substituted C3-C6 cycloalkyl group, 7) a dihydroxopyrimidyl group which may

be substituted with a) a halogen atom or a C1-C6 alkyl group, and whose nitrogen atom is further substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group, b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group or b-3) a C3-C6 cycloalkyl group or 8) a dihydroxo or tetrahydrodioxopyrazinyl group which may be substituted with a) a halogen atom or a C1-C6 alkyl group and whose nitrogen atom is further substituted with b-1) a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxy, b-2) an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group, or b-3) a C3-C6 cycloalkyl group; and Q and W are the same as or different from each other and each represents N or CH), to react with an acyl compound represented by the formula ArCOX (wherein X represents a halogen atom; and Ar represents 1) an optionally substituted aryl group, 2) an optionally substituted heteroaryl group, 3) an oxopyridyl group which may be substituted with a halogen atom or a C1-C6 alkyl group and whose nitrogen atom is substituted with a C1-C6 alkyl group or a C3-C6 cycloalkyl group, or 4) an oxopyrimidyl group which may be substituted with a halogen atom or a C1-C6 alkyl group and whose nitrogen atom is substituted with a C1-C6 alkyl group or a C3-C6 cycloalkyl group).

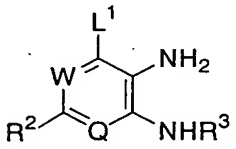
24. A process for producing an acylaminopyridine compound (A3) represented by the following formula:



(A3)

Sub A5

(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively), a salt thereof or hydrates thereof, which comprises allowing an aminopyridine compound (A2) represented by the following formula:

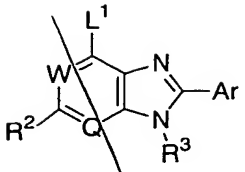


(A2)

(wherein L^1, R^2, R^3, Q and W have the same meanings as defined above, respectively) to react in the presence of pyridine with an acyl compound represented by the formula ArCOX (wherein X and Ar have the same meanings as defined above, respectively).

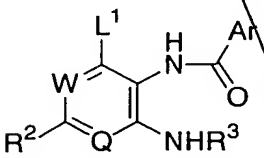
25. The process for producing an acylaminopyridine compound (A3), a salt thereof or hydrates thereof according to claim 23 or 24, wherein R^3 is an N-C1-C8 alkyl-2-oxopyrimidinyl group.

26. A process for producing an imidazopyridine compound (A4), a salt thereof or hydrates thereof represented by the following formula:



(A4)

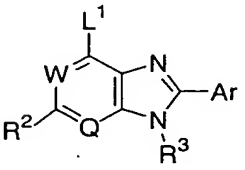
(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively), which comprises subjecting an acylaminopyridine compound (A3) represented by the following formula:



(A3)

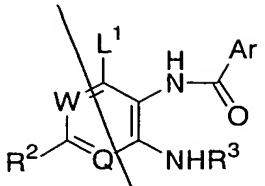
(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively) to ring-closure reaction in the presence of $POCl_3$.

27. A process for producing an imidazopyridine compound (A4), a salt thereof or hydrates thereof represented by the following formula:



(A4)

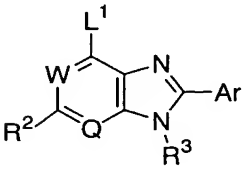
(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively), which comprises subjecting an acylaminopyridine compound (A3) represented by the following formula:



(A3)

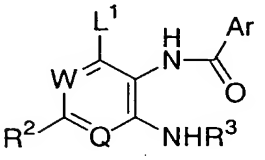
(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively) to ring-closure reaction in the presence of hydrochloric acid or using hydrochloride of an acylaminopyridine compound (A3).

28. A process for producing an imidazopyridine compound (A4), a salt thereof or hydrates thereof represented by the following formula:



(A4)

(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively), which comprises subjecting an acylaminopyridine compound (A3) represented by the following formula:

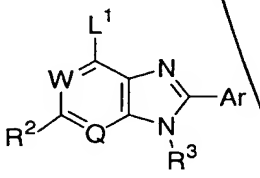


(A3)

(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively) to ring-closure reaction in NMP (1-methyl-2-pyrrolidone) under heating.

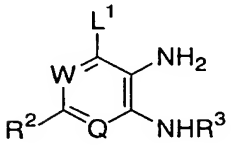
29. The process for producing an imidazopyridine compound (A4), a salt thereof or hydrates thereof according to claims 24 to 28, wherein R^3 is an N-C1-C8 alkyl-2-oxopyridinyl group.

30. A process for producing an imidazopyridine compound (A4), a salt thereof or hydrates thereof represented by the following formula:



(A4)

(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively), which comprises allowing an aminopyridine compound (A2) represented by the following formula:



(A2)

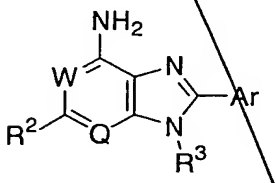
(wherein L^1, R^2, R^3, Q and W have the same meanings as defined above, respectively) to react with an acyl compound represented by the formula ArCOX (wherein X and Ar have the same meanings as defined above, respectively); and then subjecting the product to ring-closure reaction.

31. The process for producing an imidazopyridine compound (A4), a salt thereof or hydrates thereof according to claim 30, wherein the aminopyridine compound (A2) is converted in one-pot

reaction into the imidazopyridine compound (A4).

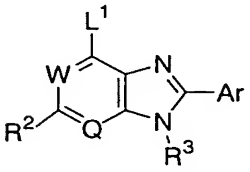
32. A process for producing an aminoimidazopyridine compound (A5), a salt thereof or hydrates thereof represented by the formula:

Sub A5



(A5)

(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively), which comprises aminating an imidazopyridine compound (A4) represented by the following formula:

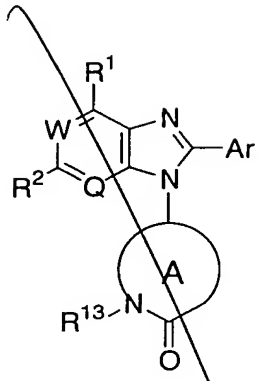


(A4)

(wherein L^1, R^2, R^3, Ar, Q and W have the same meanings as defined above, respectively).

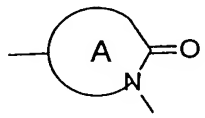
33. The process for producing an aminoimidazopyridine compound (A5), a salt thereof or hydrates thereof according to claim 32, wherein R^3 is an N-C1-C8 alkyl-2-oxopyridinyl group.

34. A process for producing an imidazopyridine compound (C3), a salt thereof or hydrates thereof represented by the formula:

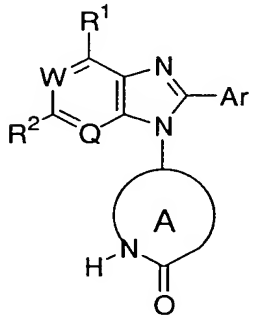


(C3)

(wherein R^{13} means a C1-C6 alkyl group which may be substituted with a halogen atom, hydroxyl or an optionally protected carboxyl group, an optionally substituted C3-C6 cycloalkyl-C1-C4 alkyl group, or an optionally substituted C3-C6 cycloalkyl group; and R^1, the formula:



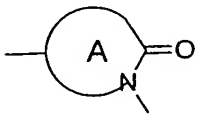
R^2, Ar, Q and W have the same meanings as defined above, respectively), which comprises alkylating an imidazopyridine compound (C2) represented by the following formula:



(C2)

(wherein R^1 represents 1) hydrogen, 2) hydroxyl, 3) a halogen

atom, 4) an optionally substituted C1-C8 alkyl group or 5) formula $-NR^4R^5$ (wherein R^4 and R^5 are the same as or different from each other and each represents hydrogen, a C1-C8 alkyl group or a C3-C8 cycloalkyl group, or a C2-C5 saturated cyclic amino group which is formed with a nitrogen atom to which they bind, whereupon this ring may contain oxygen, sulfur or nitrogen other than the nitrogen atom and may be substituted with a C1-C4 alkyl group which may be substituted with a halogen atom; the formula:



represents dihydrooxopyridinyl or -pyrimidyl, or dihydro- or tetrahydropyrazinyl; and R^2, Ar, Q and W have the same meanings as defined above, respectively.

35. A method of preventing or treating diabetes mellitus; diabetic complications; diabetic retinopathy; diseases against which the condensed imidazole compound according to any of claims 1 to 15, a pharmacologically acceptable salt thereof or hydrates thereof is effective; or diseases against which an adenosine A2 receptor antagonism is effective, by administering a pharmacologically effective amount of the condensed imidazole compound according to any of claims 1 to 15, a pharmacologically acceptable salt thereof or hydrates thereof.

36. Use of the condensed imidazole compound according to any of claims 1 to 15, a pharmacologically acceptable salt thereof or hydrates thereof, for producing a preventive or

Sub AS

therapeutic agent for diabetes mellitus; diabetic complications; diabetic retinopathy; or diseases against which the condensed imidazole compound according to any of claims 1 to 15, a pharmacologically acceptable salt thereof or hydrates thereof is effective, or an adenosine A2 receptor antagonist.